THE · EXTENSION PATHOLOGIST

A NEWS LETTER FOR EXTENSION WORKERS INTERESTED IN PLANT DISEASE CONTROL

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GLEANINGS FROM PAPERS PRESENTED AT THE RICHMOND MEETING OF THE AMERICAN PHYTOPATHOLOGICAL SOCIETY /1

The efficiency of the most common spreaders and stickers used in spray materials is greatly improved when dolomitic lime, zinc oxide, or aluminium oxide is used as a substitute for high-calcium lime in sprays containing insoluble copper fungicides (Nikitin, p. 19). /2

/1 Continued from The Extension Pathologist, pp. 11 to 16, Serial no. 36, February 1939, prepared by C. C. Allison, O. C. Boyd, O. D. Burke, Charles Chupp, Luther Shaw, and R. J. Haskell.

/2 Citations in parentheses refer to abstracts in Phytopathology 29, no. 1, January 1, 1939.

NOTE.--THE EXTENSION PATHOLOGIST is issued at intervals by the Extension Service and the Bureau of Plant Industry.

Animal and vegetable oils have direct value as fungicides and are supplements to copper sprays in the control of certain plant diseases, expecially the powdery mildews (Yarwood, p. 24).

The yellow cuprous oxides are superior to the red and purple types for seed treatments and spray fungicides because of their smaller particle size (Heuberger and Horsfall, p. 9).

A practical and effective photographic means of measuring and permanently recording the particle size of sulphur samples was reported (A. B. Groves, p. 8).

A new, practical, effective, and economical electrical device for the pasteurization of greenhouse soils was described (Newhall, p. 18).

An acetic-acid bath is highly effective in removing lead and arsenic residues from apples, when used in combination with the usual alkaline solutions (Hurt, p. 12).

Outstanding control of damping-off of sugar beets was obtained by seed treatment with copper and mercurial fungicides. Mercury injury from seed treatment was obtained only when high moisture content of the seed was coupled with a prolonged storage period. (Leach and Houston, p. 15).

Sulphur and copper fungicides can be efficiently used on peanuts for the control of Cercospora spot. Increased yields of hay and nuts from the application of fungicides have been high. (Miller, Batten, and Wingard, p. 18).

Control of red leaf of grapes, caused by mites in California, was reported in 1937, using one spray of 0.25 percent Selocide (a selenium product) plus 5 lb. wettable sulphur. In 1938, sprays of Selocide or of ammonium polysulfide gave control of this mite disease. (Hewitt, et al, p. 10).

Four summer applications of bordeaux 1-3-100, 1½-4½-100, and 2-6-100 on 4-year peach trees in Virginia gave excellent control of scab and brown rot without causing any injury to either fruit or foliage. They did not prevent arsenical injury to leaves and twigs, however, when lead arsenate was included. When zinc-lime was added to the combined spray, neither copper injury nor arsenical injury resulted. The bordeaux sprays left an objectionable residue that necessitated wiping the fruit. (Hurt, p.11).

Two species of Valsa cause branch cankers of peach trees in New York. Both of them, like the brown rot fungus, are wound parasites, although they may enter the bark through leaf scars and lenticels. One infects the branches between October and May; the other, throughout the year, while brown rot infections occur only between June and October. The Valsa cankers may be perennial; brown rot cankers commonly heal more

rapidly. Vigorous growing trees are less subject to attack than weakened ones. (Hildebrand, p. 10).

None of the apple trees inoculated with crown gall and hairy root bacteria in the nursery had died 7 years later in the orchard. However, those infected with hairy root were definitely smaller than the uninfected trees, but there was no difference in the size of the crown-gall infected trees and the uninfected trees. There was only an occasional recovery in either disease. (Ricker, p. 21).

Attention was called to white root rot of apple trees caused by a fungus (Corticium galactinum) which seems to have escaped notice during the past 35 years. It was observed in Delaware, Maryland, Virginia, and Tennessee, and is likely to be injurious only in newly cleared land or in orchards adjacent to woodland. Once infected, the apple tree may die quickly. Infected roots develop a dry rot throughout, may be knotty or warty, and are covered with a white-to-buff feltlike layer of the fungus. (Cooley and Davidson, p. 5).

The so-called internal bark necrosis so characteristic of Delicious is caused by a deficiency of boron in the soil. (Hildebrand p. 10).

In a young McIntosh apple orchard in Maine the following spray treatments over the past 11 years: (1) Dry lime-sulphur throughout the season, (2) lead arsenate for 8 years, then dry lime-sulphur during the last 3 years, (3) minimum lead arsenate spray to control chewing insects, (4) wettable sulphur spray, and (5) sulphur dust--have given the following total yield rates per tree for 1933 to 1938: 47, 65, 78, 104, and 123 lb., respectively. Tree-trunk measurements reveal no significant differences in growth for the various treatments. (Folsom, p. 6).

When various sprays including lime-sulphur, wettable sulphur, several "insoluble" copper materials, and bordeaux mixtures were compared in New Jersey during 1937 and 1938 for cherry leaf spot control, the copper sprays gave better control generally than the sulphur sprays, but also produced more injury. Lime reduced their injury. Aluminum sulfate plus lime increased the effectiveness of lime-sulphur, while orthex improved the wettable sulphur in that respect. (Daines, p. 5).

Spray tests in 1938 on Montmorency cherries in Wisconsin, indicated far better control of leaf spot with bordeaux 6-8-100 than with lime-sulphur 1-40 or with Coposil, Basi-cop, or Cupro-K, but the bordeaux-sprayed fruit was the smallest (due apparently to spray injury). (Keitt, p. 13).

Buckskin of cherry in California will cause less injury to sweet cherry trees that are worked into the scaffold limbs of Mahaleb than in cherries having a single trunk union with Mahaleb. Removal of diseased trees has given satisfactory control in some orchards but not in others.

Trees may be quickly killed by pouring a 10-percent solution of sodium arsenite into holes bored tangently into the sapwood. No insect vector of the virus is known. (Rawlins, p. 20).

The fungus, Daedalea unicolor, is generally considered a saprophyte, but it causes a distinct disease of sugar and red maples in New England, and it also attacks yellow and white birches. (Campbell, p. 3).

A new maple blight has been found in Rhode Island on five different varieties of maple, and is manifested by fewer and smaller leaves that drop earlier than on healthy trees, and by the successive dying of branches, by a reddish ooze or "bleeding" from cracks in limbs and trunk, with ultimate formation of trunk cankers. Sapwood is discolored reddish brown with olive-green margins extending from roots upward to the dying branches. A pythiaceous fungus is suspected to be the cause. (Howard and Caroselli, p. 11).

Nematode-infested, black-locust nursery stock can be freed of the gall nematode without injury by heating the seedling trees in water for 30 minutes at 120° F. (Chester and Cress, p. 4).

Inoculations of young elm trees in England in 1937 and 1938 revealed that Ulmus americana was much more susceptible to the European elm diseases than such European sorts as U. montana, U. minor, Wheatley elm on U. Montana rootstocks, and U. holla. (Walter, p. 23).

A disease of greenhouse-grown gloxinia, caused by the fungus, Phytophthora cryptogea, previously reported from Europe but not from the United States, attacks the leaves, stems, and corms. Infected leaves are water-soaked, dark brown, and flaccid. The disease spots the corms, which may later completely collapse. (Middleton and Tucker, p. 17).

A bacterial leaf spot of Dieffenbachia not heretofore reported is prevalent on D. picta in New Jersey greenhouses. It causes circular, reddish-brown leaf spots up to two-fifths inch in diameter, surrounded by light-yellow, water-soaked margins (Pirone, p. 19).

Commercial snapdragons that have been bred to withstand the older form of rust, race 1, proved susceptible in Michigan to the newer form, race 2. However, a few of the descendants of the only snapdragon plant that resisted race 1 in 1929 proved in 1938 to be highly resistant to both forms of the rust. (Nelson, p. 18).

Mercuric oxide has value as a soil antiseptic to prevent spread of the Fusarium causing bulb rot of narcissus. (Weiss and Hassis, p. 23).

Urediospores of crown rust of oats on dead oat leaves probably play no part in carrying the pathogen from one year to the next in any large area. (Rosen and Weetman, p. 21).

Small-grain kernel infection by fungi is extremely common, and a technique for estimating this has been worked out. (Greaney and Machacek, p. 8).

Organic mercury dusts are superior to other seed disinfectants tested for control of seedling blight and root rot of wheat, but increases in yield occur only when seed or soil are severely infested by pathogenic fungi. (Machacek and Greaney, p. 16).

Environmental conditions after seedlings emerge may influence markedly the incidence of loose smut of oats and covered smut of barley. (Tapke, p. 22).

Different races of Puccinia graminis tritici vary with respect to temperatures required for urediospore germination, germ tube development, infection, and development of rust. (Cassell, p. 4).

The uredial stage of Puccinia graminis apparently can persist throughout the year in southern Mexico, but in northern Mexico, winter wheat often becomes infected by spores blown from the United States. Race 56 by far the most prevalent in the United States was found in northern but not in southern Mexico. (Stakman, Popham, and Cassell, p. 22).

Barberry eradication near oatfields in Pennsylvania resulted in doubling oat yields. An excellent motion picture on barberry eradication in Pennsylvania illustrated methods and results. (Wright and Kirby, p. 24).

Fall-sown winter wheat in Oklahoma appears to be infected mainly by leaf-rust urediospores blown in from northern wheat-growing regions. (Chester, p. 4).

GEORGIA FARMERS FIGHT TOBACCO BLUE MOLD

During the tobacco blue-mold campaign of 1938, a total of 107 method spray demonstrations were given with an attendance of 8,353. In addition to this, county agents gave numerous demonstrations in their respective counties. If accurate figures were available on this point it is quite likely that the total given above would be more than doubled.

In checking with the manufacturers of spraying equipment, it is estimated that 1,273 bucket-type spray pumps, 650 barrel-type pumps and 200 traction-type outfits were sold in the State during the past season. Approximately 6,000 pounds of red copper oxide, 3,000 gallons of lethane spreader, and 6,000 gallons of cottonseed oil were used during the spray season.

—S. B. Fenne, extension plant pathologist in Georgia during 1938.

MELON AND CUCUMBER DISEASE CONTROL PROGRESSES IN NEW YORK

Probably more time was spent in controlling the diseases of these two than any other vegetable crops during the 1938 season. This seemed needful since Macrosporium blight and anthracnose were more prevalent than they had been during the previous quarter of a century. It was noticed again that the blight was almost in direct ratio to the amount of wind-break or weed coverage. When all the prevailing winds had a clean sweep of the fields, there was almost no loss from the blight.

Spraying and Dusting

As has been mentioned in previous reports, cucurbit crops are injured by spraying with bordeaux mixture or dusting with copper-lime dust. During the 2 previous years, a dust had been made from the insoluble copper compounds, flour, and calcium arsenate. This was noninjurious to blossoms, but it cost too much. In the meanwhile, Dr. James G. Horsfall, in cooperation with the entomologists, was requested to develop a dust that would have the advantages of the copper-flour dust and be cheap enough to use. Dr. Horsfall, last winter, gave us a formula for such a dust. It was mentioned at winter meetings and in publicity material put out by the extension specialist. According to the report of the manufacturing chemists who made the copper ingredients, 100 tons of the dust were used.

In some ways the dust proved quite desirable, and in others it needed still further improvement. It did increase the set of fruit 10 to 40 percent as compared with bordeaux mixture. One grower of a large acreage of melons stated that in previous years, when spraying with bordeaux mixture, his harvesting period never lasted longer than 30 days. This year with the new dust, which did not control the blight as well as did bordeaux mixture, the harvesting period lasted 41 days and gave a corresponding increase in yield.

The copper content purposely was reduced to 4 percent so that vines and fruit would not be stunted and blossoms killed. This amount of copper was not sufficient to control effectively the serious epidemic of blight that occurred. Therefore, another conference was arranged with Dr. Horsfall and the dust manufacturers. It was planned to obtain a better mechanical mixture of the copper and also to increase it to 5 percent. This improvement of the dust should increase the fungicidal value and still not injure the plants.

No doubt a much larger tonnage will be used during 1939, especially since the distributors of the dust have promised to sell it in 5- and 50-pound containers so that it may be available even for small gardens.

Seed Treatment

Seed treatment of cucumbers, melons, and other cucurbits with corrosive sublimate is gaining slowly in the State. Again, demonstration treatments were held in Schenectady and Niagara counties and some seed sent by county agricultural agents was treated in the laboratory by the extension specialist.

Fusarium Wilt

Two cooperative tests again were conducted with the plant breeding department for the control of Fusarium wilt of muskmelons, one on the farm of Henry Miller, Monroe County, and the other on Mr. Bradley's farm in Niagara County. A large number of hybrids and varieties were tested again for resistance, and some very promising strains are being produced. Some growers, whose land is heavily infested with the Fusarium, are already using some of these strains.

Aside from these two plots, a survey was made to see how far the disease had spread in the State. It now extends along the border of Lake Ontario from the Niagara River to the western edge of Wayne County. It was found for the first time in one field in the Hudson Valley.

Mosaic

The melon and cucumber program respecting malnutrition, damping-off control, rotations, and mosaic control were continued as in past years. The mosaic is gradually being reduced up-State by a weed eradication campaign. It, however, is still too prevalent in the old cucumber sections.

—Charles Chupp, extension plant pathologist Annual Report for 1938, New York.

COUNTY PLANNING GROUPS MENTION ALFALFA DISEASES AS A PROBLEM

For the past 15 or 20 years growers in the San Joaquin Valley and southern California counties have reported that alfalfa stands become too thin after 2 or 3 years to be profitable. J. L. Weimer, U. S. Department of Agriculture, found that bacterial wilt and dwarf were responsible. In both diseases early and frequent cutting was found to be an important contributing factor, but growers have seldom made use of this information as delayed cutting conflicts with market hay requirements. However, it might fit the needs of the grower who uses his own hay.

In the first series of county agricultural economic planning conferences in California, this alfalfa problem was the only disease mentioned.

In response to specific requests from growers of San Bernardino and Riverside Counties, the specialist and county agents made surveys at two different seasons. Dwarf and wilt were found still to be the major diseases, and there was evidence that fertility did not influence the incidence of these diseases. All growers cut alfalfa when immature, so there was no field evidence to be secured on this point. No resistant varieties are yet generally available. An attempt is being made to secure cooperators who will make age-of-cutting trials.

The pathologist spent two days in the field in Kern County in response to an emergency call. In a 40-acre field of year-old alfalfa, the yield fell off sharply as the season progressed. The difficulty was recognized as being new to the district, hence the concern. The depressed growth was found to be caused by the invasion of buds by a species of Rhizoctonia. Many such problems arise each year.

--C. E. Scott, extension plant pathologist, Annual Report, 1938, California.

EXTENSION WORK ON POTATO SCAB IN PENNSYLVANIA

A potato tuber disease check-up in 1937 and 1938 has shown common scab causes the most serious losses of any of the diseases attacking the potato tuber. Forty-one sets of data indicated that potatoes produced at pH 5 have very little scab. Those produced at pH 5.6 do not have sufficient scab to cause serious reduction of the quality of the crop, but those produced in soil sweeter than pH 5.6 are in considerable danger of severe reduction in marketable tubers harvested. It was found in one county where a large percentage of the potatoes were planted on soil limed sufficiently to grow sweetclover, that at least one-half of the crop was unmarketable due to this disease alone. On these farms potato production was no longer profitable, and growers were being forced to discontinue their most important cash crop. In two demonstrations in another county, where it was possible to compare in the same field potatoes grown at pH 6.3 to 6.5 with those grown at 5 to 5.3, an average of 40-percent scab was found at higher pH, and only 6-percent scab at the lower pH. These figures checked very closely with scab control recommendations and taught farmers that potatoes produced at the proper scab-prevention reaction in these cases increased the marketable tubers by 34 percent.

In the spring of 1938, fertilizers containing yellow mercuric oxide were advertised to growers as being a cure for their scab troubles. Growers were warned by extension plant pathologists that they were liable to increase the amount of scab rather than decrease it, and demonstrations were started to show the relative uncertainty of such a fertilizer. In 21 comparisons where these fertilizers were compared with those that did not contain yellow mercuric oxide, it was found that this special fertilizer induced 22.17 per-

cent more scab, of which 17.6 percent was entirely unmarketable. Those farmers not using this fertilizer as a result of recommendations had almost one-fifth more marketable potatoes, and consequently the acre yields were 20-percent more valuable.

In nine demonstrations in the principal potato-producing areas where seed treatments were compared, those containing mercury had about 5-percent more scab than the untreated; those containing formaldehyde had 4-percent less scab than the untreated. These figures substantiate recommendations that where seed treatments are used, formaldehyde is preferred.

--Annual Report 1938, Extension plant pathology, Pennsylvania.

COTTONSEED TREATMENT PROFITABLE

Cottonseed treating work started in Georgia in 1936, resulting in about 25,000 bushels being treated that year. In 1937 approximately 100,000 bushels of seed cotton were treated. While no actual figures are yet available for 1938, it is estimated that this amount was certainly doubled.

During 1938 an intensive seed-treating campaign was carried on by the use of circular letters and newspaper articles. Thirty result demonstrations in 12 middle-Georgia counties were carefully supervised. An increase of 40.7 percent in stand before chopping was observed in the treated over the untreated, and an increase at picking time of 20 percent in the number of plants and 24 percent in the number of bolls. This resulted in a 25-percent increase, or 197 pounds of seed cotton per acre, making an increase of $7.22 per acre in favor of the treated over the untreated plots. The cost of treating cottonseed is approximately 20 cents per acre.

Several seed dealers and ginners have stated that they intend to install power-cleaning and seed-treating equipment in order to give better service to their local growers.

--S. B. Fenne, extension plant pathologist in Georgia during 1938.

The California plant-pathology specialist presented a spray demonstration for the 4-H Club Convention at Davis in September 1938.

COPPER OXYCHLORIDE GIVES PROMISE AS A CHERRY SPRAY

There were six cherry-spraying demonstrations conducted in Pennsylvania in 1938. These involved a comparison of recommended lime-sulphur spray with substitute materials, the principal one of which was copper oxychloride. This material has given very promising experimental results, and it was felt it should be tried by Pennsylvania growers.

In parts of the State where cherry leaf spot was not a problem this year, no results were obtained, but in three demonstrations carried on in Erie County where leaf spot was a problem, the copper oxychloride gave very satisfactory results, aiding the trees to hold their foliage better than those that received other sprays.

--Extension plant pathology
Annual Report, Pennsylvania, 1938.

PLANT DISEASE CONFERENCES FOR COUNTY AGENTS SUCCESSFUL

Three 1-day, pest-control conferences for California County agents were conducted by the plant pathology specialist during 1938. The first was a small conference in the spring at Davis, for an informal discussion of orchard spraying. Fall meetings were held at Davis and Berkeley. The former meeting was attended by 21 agents from 16 counties. This included all but one important fruit county of the interior valley. With the addition of visiting and participating research workers, the group was a little larger than desirable because there was less discussion in this than in the other meetings. At Berkeley there were 10 counties represented out of 11 invited. The subject matter considered was plant disease and insect pests of diciduous fruit trees with the spray programs of each crop being reviewed in detail. Members of the Entomology and Plant Pathology Divisions were on hand to answer questions and give progress reports on research studies. There were no scheduled talks, thus giving ample opportunity for discussion.

Similar meetings are planned for the fall of 1939, where truck, and field-crop disease and insect control will be the topic.

--C. E. Scott, extension plant pathologist, Annual Report 1938, California.

COUNTY CONFERENCE USEFUL IN SOLVING PROBLEM

Pears are the principal fruit crop raised in Lake County, Calif. During the past season or two, keen competition among spray salesmen has left the grower confused as to the best spray program, the points involving kinds of spray materials, dilutions, and timing. An evening conference attended by State and university entomologists, the county agricultural commissioner, 8 or 10 leading growers, packing-house managers and field men, and the extendion pathologist, was called by the county agent. The evening was spent in a complete discussion of the pear spray program with differences of opinion between agencies being ironed out or compromised. The county agent later prepared a printed spray chart, bearing the endorsement of the agencies present, which was supplied to growers and posted in all packing houses in the county.

--C. E. Scott, extension plant pathologist Annual Report 1938, California.

GEORGIA MOUNTAIN-GROWN POTATOES CERTIFIED

In 1938, growers in five mountain counties planted 90 acres of certified Bliss Triumph potatoes. The seed was bought through the extension marketing specialist in New Brunswick, Can.

Out of the 68 growers planting certified seed, 34 had their fields certified and shipped 2,257 barrels of No. 1's, 256 barrels of No. 2's and 4 barrels of No. 3's, or a total of 2,517 barrels.

--S. B. Fenne, extension plant pathologist, in Georgia, during 1938.